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Groundwater sampling results, Livingston Rail Yard, Livingston, Montana

OCTOBER, 1989 MONTHLY GROUNDWATER SAMPLING RESULTS LIVINGSTON RAIL YARD LIVINGSTON, MONTANA

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OCTOBER 1989 MONTHLY GROUNDWATER SAMPLING RESULTS LIVINGSTON RAIL YARD LIVINGSTON, MONTANA

Submitted To:

Montana Department of Health and Environmental Sciences
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Helena, Montana 59620

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Submittal Date:

December 29, 1989

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1.0 INTRODUCTION

Envirocon, Inc., representing Burlington Northern Railroad, performed the October monthly groundwater sampling at the Livingston rail yard, Livingston, Montana on October 20, 1989. As shown in Table 1.0, a total of 14 samples were collected, twelve from eleven monitoring wells and two from the B Street municipal water well. Table 1.0 lists the wells sampled, sampling method, and method of analysis. Figure 1.0 shows the locations of the wells sampled.

All samples were analyzed by Energy Laboratories, Inc. (ELI) for volatile organic compounds (VOCs) by EPA Method 601 or 524.2. Table 2.0 summarizes the analytical results in comparison to previous sample results. Complete laboratory analyses are included in Appendix A.

All interpretations presented in this report are necessarily based on information available at the time of publication. Interpretations may change when further data is available.

2.0 RESULTS AND INTERPRETATION

The predominant contaminants detected during the October sampling round were chlorinated ethenes, which included tetrachloroethene (PCE), trichloroethene (TCE), and dichloroethene (DCE). Nine of the twelve wells sampled contained detectable concentrations of PCE, while TCE and DCE were detected in eight wells. Concentrations of the chlorinated ethenes are presented in Table 2.0.

At most wells PCE, TCE, and DCE concentrations varied only slightly from those detected during the September 1989 sampling round, as shown in Table 2.0. DCE concentrations increased at monitoring well L-88-10 (Sample No. 140101-136) from 410 ug/l in September to 463 ug/l. This well has also shown an increase in chlorobenzene concentration since September. These increases were the continuation of trends which began in May 1989.

The increased DCE and chlorobenzene concentrations at well L-88-10 do not appear to be caused by infiltration at the cinder pile lagoon. Well L-87-3 (Sample No. 140101-141), which is located directly downgradient from the cinder pile, did not indicate a similar increase. The DCE and chlorobenzene may be from the Waste Water Treatment Plant (WWTP) sump; however, the exact source and release mechanisms are unclear. Sampling of well L-87-2 in November should aid in the interpretation of these changes in contaminant concentrations.

The chlorobenzene concentration at well LS-11 has increased continuously since August 1989. In contrast, nearby well LS-8 (Sample No. 140101-139) has not shown a detectable concentration of chlorobenzene since May 1989. The summer rise of the water table below the API separator and overflow pond and the resultant leaching is one possible source of

TABLE 1.0

CORRELATION OF WELL AND SAMPLE NUMBERS

SAMPLE NUMBER	WELL NUMBER	SAMPLE METHOD	EPA METHOD OF ANALYSIS	SAMPLE DATE
140101-131	6	DED*	601	10/20/89
140101-132	7	DED	601	10/20/89
140101-133	L-87-7	DED	524.2	10/20/89
140101-134	L-87-8	DED	601	10/20/89
140140-135	L-88-13	DED	601	10/20/89
140101-136	L-88-10	DED	601	10/20/89
140101-137	L-88-10 (dup)	DED	601	10/20/89
140101-138	LS-11	DED	601	10/20/89
140101-139	LS-8	DED	601	10/20/89
140101-140	8	DED	601	10/20/89
140101-141	L-87-3	DED	601	10/20/89
140101-142	L-87-5	DED	601	10/20/89
140101-144	trip blank	N/A	601	10/20/89
140101-145	B Street Well	TAP	524.2	10/20/89
140101-146	B Street Well (dup)	TAP	524.2	10/20/89

* DED: dedicated sampling pump

TABLE 2.0

COMPARISON OF MONTHLY ANALYTICAL RESULTS

WELL NO.	PCE (ug/l)						TCE (ug/l)						DCE* (ug/l)						2-CHLOROTOLUENE						CHLOROBENZENE					
	MAY	JUNE	JULY	AUG	SEP	OCT	MAY	JUNE	JULY	AUG	SEP	OCT	MAY	JUNE	JULY	AUG	SEP	OCT	MAY	JUNE	JULY	AUG	SEP	OCT	MAY	JUNE	JULY	AUG	SEP	OCT
1			0.66	0.62					<0.5	<0.5					<1.0	<1.0					<1.0						<1.0			
2			0.7	1.3					<0.5	<0.5					<1.0	<1.0					<1.0	<1.0					<1.0	<1.0		
3	0.69			0.74			<0.5			<0.5			<1.0	<1.0		<1.0			<1.0			<1.0			<1.0			<1.0		
4				<0.5						<0.5						<1.0						<1.0						<1.0		
5	<0.5			<0.5			<0.5			<0.5			<1.0			<1.0			<1.0			<1.0			<1.0			<1.0		
6	7.1	11	7.2	4.9	3.9	**4.2**	<0.5	0.5	<0.5	<0.5	<0.5	**<0.5**	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**
7	**33**	**7.9**	**0.8**	**0.5**	**<0.5**	**<0.5**	**1.2**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**2.9**	**1.3**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**
8	180	188	151	126	112	**96**	9.9	10	8.5	10	5.5	**5.1**	17	24	35	27	19	**13**	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**
11			<0.5	<0.5					<0.5	<0.5					<1.0	<1.0					<1.0	<1.0					<1.0	<1.0		
L-87-1	<0.5			<0.5			<0.5			<0.5			<1.0			<1.0			<1.0			<1.0			<1.0			<1.0		
L-87-2																														
L-87-3	202	183	189	195	206	**197**	24	22	18	17	15	**15**	68	121	81	56	46	**42**	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**	<1.0	<1.0	<1.0	<1.0	<1.0	**<1.0**
L-87-4	<0.5	<0.5		<0.5			<0.5	<0.5		<0.5			<1.0	<1.0		<1.0			<1.0	<1.0		<1.0			<1.0	<1.0		<1.0		
L-87-5	**335**	**350**	**349**	**367**	**361**	**355**	**8.7**	**11**	**15**	**15**	**12**	**13**	**5.4**	**6.2**	**7.5**	**7.8**	**7**	**6.8**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**
L-87-6																														
L-87-7			<0.5	<0.5	0.87	**<0.5**			<0.5	<0.5	<0.5	**<0.5**			<1.0	<1.0	<1.0	**<1.0**			1.1	1.1	1	**1**			<1.0	<1.0	<1.0	**<1.0**
L-87-8	**58**	**32**	**68**	**98**	**104**	**118**	**7.8**	**4.3**	**7.3**	**11**	**13**	**10**	**3.5**	**2.4**	**6.1**	**9.3**	**5.1**	**8**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**1**	**<1.0**
L-88-9	<1.0			<0.5			<0.5			<0.5			<1.0			<1.0			<1.0			<1.0			<1.0			<1.0		
L-88-10	160		137	155	147	**148**	31		28	30	30	**32**	106.3		197.1	357	410	**463**	<1.0		1	3.6	5.7	**5**	8.7		10	28	36	**39**
L-88-11	<0.5			<0.5			<0.5			<0.5			<1.0			<1.0			<1.0			<1.0			<1.0			<1.0		
L-88-12	255			197			4.9			4.5			3.5			2.1			<1.0			<1.0			<1.0			<1.0		
L-88-13	**52**	**62**	**69**	**80**	**80**	**86**	**7.6**	**8.1**	**11**	**14**	**14**	**14**	**6.8**	**8.1**	**17**	**24**	**27**	**21**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**1**	**<1.0**	**<1.0**	**<1.0**	**2.2**	**3.6**	**3.2**	**2.9**
LS-6	<0.5			<0.5			<0.5			<0.5			<1.0			<1.0			<1.0			<1.0			<1.0			<1.0		
LS-7	<0.5			<0.5			<0.5			<0.5			<1.0			<1.0			<1.0			<1.0			<1.0			<1.0		
LS-8	**146**	**181**	**136**	**98**	**86**	**96**	**20**	**16**	**14**	**7.8**	**6.1**	**5.7**	**84**	**69**	**45**	**21**	**17**	**13**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**27**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**
LS-10																														
LS-11	**115**	**164**		**23**	**17**	**11**	**17**	**15**		**30**	**24**	**19**	**58**	**60**		**122**	**140**	**110**	**<1.0**	**<1.0**		**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**		**167**	**275**	**319**
RAINBOW	35						5.2						8.9						<1.0						<1.0					
POTW	73			46			6.9			2.1			9.2			5.5			<1.0			<1.0			<1.0			<1.0		
B-STR.				**	<0.5	**<0.5**				**	<0.5	**<0.5**				**	<1.0	**<1.0**					<1.0	**<1.0**					<1.0	**<1.0**
D-STR				<0.5						<0.5						<1.0														
L-STR.	<0.5			<0.5			<0.5			<0.5			<1.0			<1.0			<1.0						<1.0					
Q-STR.	0.66			0.95			<0.5			<0.5			<1.0			<1.0			<1.0						<1.0					
CLARENCE				<0.5						<0.5						<1.0														
WERNER				<0.5						<0.5						<1.0														

Notes:

* Includes both cis-1,2 and trans-1,2 DCE

** Not sampled due to construction near well

*** Total Petroleum Hydrocarbons

chlorobenzene; however, the reason for the difference in sample results between the two wells is unclear. Excavation of the contaminants from within the API separator and overflow pond and other proposed investigations should eliminate further contributions.

Contaminants detected in well L-87-7 (Sample No. 140101-133) were primarily gasoline constituents, as shown in Table 3.0. With the exception of 2-chlorotoluene, the constituents shown have not been detected in other wells at the rail yard and do not appear to be associated with the chlorinated ethenes or the diesel plume. The source of these compounds could possibly be from spills or leaks from the nearby gasoline storage tanks along Park Street, shown on Figure 1.0.

2.1 Diesel Sample Results

Free product diesel fuel samples were collected on October 20, 1989 from monitor wells LB-4 (Sample No. 140101-148), LS-12 (Sample No. 140101-149), and from the fuel filter of a locomotive in the Livingston Rebuild Center shops (Sample No. 140101-150). One other sample was collected from monitor well LPW-1 (Sample No. 140101-130) on September 23, 1989. Samples were analyzed by ELI according to EPA Method 601. Analytical results are included in Appendix B.

No detectable concentrations of chlorinated compounds were found in samples from wells LB-4, LS-12 or the locomotive, however, several compounds - including 790 ug/l of 2-chlorotoluene - were detected in well LPW-1, (Appendix B). The source of these chlorinated compounds in the diesel plume at well LPW-1 may be leachate from the nearby WWTP sump. On the other hand, the diesel in LPW-1 may be from a different refiner than that in LB-4 and LS-12. Chlorinated compounds were added by some refiners for performance enhancement. More diesel fuel samples will be taken, if necessary, to further delineate the extent of these compounds in the diesel plume.

3.0 QA/QC RESULTS

Envirocon followed the QA/QC program outlined in Section 10.0 of the Interim Remedial Measures Work Plan (IRMWP) during the October 1989 monthly sampling round. This program includes:

Field QA/QC
- field duplicates
- MDHES splits
- trip blanks
- equipment blanks

Laboratory QA/QC
- spiked analyses
- laboratory duplicates
- EPA QA/QC samples

TABLE 3.0

SUMMARIZED RESULTS FROM MONITORING WELL L-87-7 (140101-133)

CONSTITUENT	CONCENTRATION (ug/l)
Benzene	0.79
Ethylbenzene	6.00
Isopropylbenzene	6.00
n-Propylbenzene	3.40
2-Chlorotoluene	1.00
tert--Butylbenzene	4.60
n-Butylbenzene	4.00
Napthalene	21.00

QA/QC samples were shipped "blind" to the laboratory and analyzed by the same analytical methods (EPA methods 601 and 524.2) as the field samples.

3.1 Field QA/QC

Two field duplicates and one trip blank were used to validate field procedures. No equipment blanks were necessary because all water samples were taken from wells equipped with dedicated samplers or an existing pump (i.e. B Street city supply well).

3.1.1 Field Duplicates

Field duplicates were collected from well L-88-10 and the B Street well (Sample No. 140101-145) and were sent blind to ELI. As shown in Appendix A, analysis of the duplicates shows close correlation with the original samples from these wells. This indicates that laboratory procedures are sufficient to generate reproducible results.

3.1.2 MDHES Splits

The MDHES took a split sample with Envirocon at monitor well L-87-5. As shown in Appendix C, the results were extremely close to each other. This indicates that the sampling and analytical procedures are capable of providing reproducible results.

3.1.3 Trip Blanks

As shown in Appendix A, no analytes were detected in the trip blank. This indicates that sample handling and shipping protocols were sufficient to maintain sample integrity.

3.1.4 Equipment Blank

No equipment blank was obtained since all samples were collected using dedicated samplers.

3.2 Laboratory QA/QC

ELI conducted one spiked analysis, one laboratory duplicate analysis, and one set of EPA QA/QC samples to validate laboratory procedures. ELI's QA/QC plan is on file with Montana Department of Health and Environmental Sciences.

3.2.1 Spiked Analysis

Spiked analysis was conducted on sample 140101-139 from well LS-8. Results of the analysis are shown in Appendix A. The percent recoveries of the test values are all within acceptable ranges. These results indicate that ELI's laboratory equipment and procedures were acceptable to provide satisfactory results.

3.2.2 Laboratory Duplicate Analysis

ELI performed a duplicate analysis on sample 140101-138 from well LS-11. As shown in Appendix A, the concentrations of VOC's reported in the duplicate analysis are very close to those reported in the original sample analysis. This indicates that laboratory equipment and procedures were adequate to provide reproducible analytical results.

3.2.3 EPA QA/QC Samples Analysis

ELI analyzed one set of EPA QA/QC reference samples in addition to samples submitted by Envirocon. All test values were within acceptable ranges for percent recoveries. These results indicate that laboratory equipment and procedures were adequate to provide accurate results.

APPENDIX A

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PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19103	89-19104	89-19105
SAMPLE IDENTIFICATION	140101-144	140101-131	140101-132
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1000	1025	1130
Purgeable Organics (EPA Method 601):	ug/l	ug/l	ug/l
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	4.2	<0.50
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	<0.50	<0.50	<0.50
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston.

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MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19106	89-19107	89-19108
SAMPLE IDENTIFICATION	140101-134	140101-135	140101-136
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1300	1405	1500
Purgeable Organics (EPA Method 601):	ug/l	ug/l	ug/l
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	2.9	39
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	5.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	2.1
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	2.6
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	8.0	21	459
trans-1,2-Dichloroethene	<1.0	<1.0	4.2
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	118	86	148
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	10	14	32
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19109	89-19110	89-19111
SAMPLE IDENTIFICATION	140101-137	140101-138	140101-139
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1500	1540	1605
Purgeable Organics (EPA Method 601):	ug/l	ug/l	ug/l
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	40	319	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	5.1	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	2.1	1.2	<1.0
1,3-Dichlorobenzene	<1.0	3.5	<1.0
1,4-Dichlorobenzene	2.8	43	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	454	84	13
trans-1,2-Dichloroethene	4.5	26	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	141	11	96
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	33	19	5.7
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	1.7	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19110 dup
SAMPLE IDENTIFICATION	140101-138
SAMPLE DATE	10/20/89
SAMPLE TIME	1540
Purgeable Organics (EPA Method 601):	ug/l
Bromodichloromethane	<1.0
Bromoform	<1.0
Bromomethane	<1.0
Carbon tetrachloride	<0.50
Chlorobenzene	333
Chloroethane	<1.0
2-Chloroethylvinyl ether	<1.0
2-Chlorotoluene	<1.0
Chloroform	<1.0
Chloromethane	<1.0
Dibromochloromethane	<1.0
1,2-Dichlorobenzene	1.0
1,3-Dichlorobenzene	3.4
1,4-Dichlorobenzene	42
1,1-Dichloroethane	<1.0
1,2-Dichloroethane	<0.50
1,1-Dichloroethene	<0.50
cis-1,2-Dichloroethene	88
trans-1,2-Dichloroethene	28
1,2-Dichloropropane	<1.0
cis-1,3-Dichloropropene	<1.0
trans-1,3-Dichloropropene	<1.0
Methylene chloride	<1.0
1,1,2,2-Tetrachloroethane	<1.0
Tetrachloroethene	14
1,1,1-Trichloroethane	<0.50
1,1,2-Trichloroethane	<1.0
Trichloroethene	18
Trichlorofluoromethane	<1.0
Vinyl chloride	1.8
Dichlorodifluoromethane	<1.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19112	89-19113	89-19114
SAMPLE IDENTIFICATION	140101-140	140101-141	140101-142
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1645	1710	1740
Purgeable Organics (EPA Method 601):	ug/l	ug/l	ug/l
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	13	42	6.8
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	96	197	355
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	5.1	15	13
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19115	89-19116	89-19117
SAMPLE IDENTIFICATION	140101-133	140101-145	140101-146
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1200	1145	1150
VOLATILE ORGANIC CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	0.79	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

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LAB NO.	89-19115	89-19116	89-19117
SAMPLE IDENTIFICATION	140101-133	140101-145	140101-146
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1200	1145	1150
VOLATILE ORGANIC CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	6.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	6.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	3.4	<1.0	<1.0
2-Chlorotoluene	1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	4.6	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	4.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	21	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: EPA WATER SUPPLY QUALITY
CONTROL SAMPLE

Volatile Organic Contaminants

CONSTITUENT	True Value ug/l	P (%)	Range for P (%)
Bromochloromethane	5.0	111	60-140
Chloroform	5.0	112	60-140
Carbon Tetrachloride	5.1	100	60-140
Trichloroethene	5.0	103	60-140
1,2-Dibromoethane	5.0	126	60-140
1,1,1,2-Tetrachloroethane	4.9	108	60-140
Tetrachloroethene	5.0	82	60-140
1,2-Dibromo-3-Chloropropane	5.0	109	60-140
1,3-Dichlorobenzene	5.0	107	60-140

P = percent recovery measured.

NOTE: This EPA Quality Control
sample was analyzed with your
lab no.s 89-19103 thru 89-19114
with the above results

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston/BN

Quality Assurance Spiked Analysis

CONSTITUENT	SPIKE AMOUNT ug/l	P (%)	RANGE FOR P (%)
Bromochloromethane	5.0	106	60-140
Chloroform	5.0	112	60-140
Carbon Tetrachloride	5.1	104	60-140
Trichloroethene	5.0	111	60-140
1,2-Dibromoethane	5.0	102	60-140
1,1,1,2-Tetrachloroethane	4.9	92	60-140
Tetrachloroethene	5.0	95	60-140
1,2-Dibromo-3-Chloropropane	5.0	118	60-140
1,3-Dichlorobenzene	5.0	108	60-140

P = percent recovery measured.

NOTE: Lab no. 89-19111 was spiked
with the above constituents
with these results.

cc: Envirocon, Livingston.

APPENDIX B

ENVIROCON, INC.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston/BN

Diesel at LPW-1

LAB NO.	89-16356
SAMPLE IDENTIFICATION	140101-130
SAMPLE DATE	09/23/89
SAMPLE TIME	
Purgeable Organics (EPA Method 601):	ug/g
Bromodichloromethane	<5.0
Bromoform	<5.0
Bromomethane	<5.0
Carbon tetrachloride	<5.0
Chlorobenzene	63
Chloroethane	<5.0
2-Chloroethylvinyl ether	<5.0
2-Chlorotoluene	790
Chloroform	<5.0
Chloromethane	<5.0
Dibromochloromethane	<5.0
1,2-Dichlorobenzene	1.3
1,3-Dichlorobenzene	<5.0
1,4-Dichlorobenzene	6.3
1,1-Dichloroethane	<5.0
1,2-Dichloroethane	<5.0
1,1-Dichloroethene	<5.0
cis-1,2-Dichloroethene	38
trans-1,2-Dichloroethene	<5.0
1,2-Dichloropropane	<5.0
cis-1,3-Dichloropropene	<5.0
trans-1,3-Dichloropropene	<5.0
Methylene chloride	<5.0
1,1,2,2-Tetrachloroethane	<5.0
Tetrachloroethene	<5.0
1,1,1-Trichloroethane	<5.0
1,1,2-Trichloroethane	<5.0
Trichloroethene	<5.0
Trichlorofluoromethane	<5.0
Vinyl chloride	<5.0
Dichlorodifluoromethane	<5.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

SOIL ANALYSIS

SUBMITTED 10/23/89
REPORTED 11/01/89

LAB NO.	89-19098	89-19099	89-19100
SAMPLE IDENTIFICATION	140101-148	140101-149	140101-150
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	0915	1040	1155
Purgeable Organics (EPA Method 601):	ug/g	ug/g	ug/g
Bromodichloromethane	<10	10	<10
Bromoform	<10	10	<10
Bromomethane	<10	10	<10
Carbon tetrachloride	<10	10	<10
Chlorobenzene	<10	10	<10
Chloroethane	<10	10	<10
2-Chloroethylvinyl ether	<10	10	<10
2-Chlorotoluene	<10	10	<10
Chloroform	<10	<10	<10
Chloromethane	<10	<10	<10
Dibromochloromethane	<10	10	<10
1,2-Dichlorobenzene	<10	10	<10
1,3-Dichlorobenzene	<10	10	<10
1,4-Dichlorobenzene	<10	10	<10
1,1-Dichloroethane	<10	10	<10
1,2-Dichloroethane	<10	<10	<10
1,1-Dichloroethene	<10	<10	<10
cis-1,2-Dichloroethene	<10	<10	<10
trans-1,2-Dichloroethene	<10	<10	<10
1,2-Dichloropropane	<10	<10	<10
cis-1,3-Dichloropropene	<10	<10	<10
trans-1,3-Dichloropropene	<10	<10	<10
Methylene chloride	<10	<10	<10
1,1,2,2-Tetrachloroethane	<10	<10	<10
Tetrachloroethene	<10	<10	<10
1,1,1-Trichloroethane	<10	<10	<10
1,1,2-Trichloroethane	<10	<10	<10
Trichloroethene	<10	<10	<10
Trichlorofluoromethane	<10	<10	<10
Vinyl chloride	<10	<10	<10
Dichlorodifluoromethane	<10	<10	<10

cc: Envirocon, Livingston.

APPENDIX C

ENVIROCON, INC.

VOC ANALYSIS REPORT
CHEMISTRY LABORATORY BUREAU
DEPARTMENT OF HEALTH AND ENVIRONMENTAL SCIENCES

CITY: BN Livingston
SITE: Moniter Well #L87-5

DATE COLLECTED: 10/20/89
DATE RECEIVED: 10/25/89
DATE ANALYSIS COMPLETE: 11/3/89

LABORATORY NUMBER: 89W 3140

COMPOUND	CONCENTRATION (Micrograms/L)
Trichloroethylene	10.8
Carbon tetrachloride	<.5
1,1,1-Trichloroethane	<.5
Vinyl chloride	<.5
1,2-Dichloroethane	<.5
Benzene	<.5
1,1-Dichloroethylene	<.5
p-Dichlorobenzene	<.5
Bromobenzene	<.5
Bromodichloromethane	<.5
Bromoform	<.5
Bromomethane	<.5
Chlorobenzene	<.5
Chlorodibromomethane	<.5
Chloroethane	<.5
Chloroform	<.5
Chloromethane	<.5
o-Chlorotoluene	<.5
p-Chlorotoluene	<.5
Dibromomethane	<.5
1,3-Dichlorobenzene	<.5
1,2-Dichlorobenzene	<.5
trans-1,2-Dichloroethylene	<.5
cis-1,2-Dichloroethylene	5.4
Dichloromethane	<.5
1,1-Dichloroethane	<.5
1,1-Dichloropropene	<.5
1,2-Dichloropropane	<.5
1,3-Dichloropropane	<.5
1,3-Dichloropropene	<.5
2,2-Dichloropropane	<.5

LABORATORY NUMBER: 89W 3140

COMPOUND	CONCENTRATION (Micrograms/L)
Ethylbenzene	<.5
Styrene	<.5
1,1,2-Trichloroethane	<.5
1,1,1,2-Tetrachloroethane	<.5
1,1,2,2-Tetrachloroethane	<.5
Tetrachloroethylene	344
1,2,3-Trichloropropane	<.5
Toluene	<.5
p,m-Xylene	<.5
o-Xylene	<.5
Bromochloromethane	<.5
n-Butylbenzene	<.5
Dichlorodifluoromethane	<.5
Fluorotrichloromethane	<.5
Hexachlorobutadiene	<.5
Isopropylbenzene	<.5
p-Isopropyltoluene	<.5
Naphthalene	<.5
n-Propylbenzene	<.5
sec-Butylbenzene	<.5
tert-Butylbenzene	<.5
1,2,3-Trichlorobenzene	<.5
1,2,4-Trichlorobenzene	<.5
1,2,4-Trimethylbenzene	<.5
1,3,5-Trimethylbenzene	<.5

Comments: Sampled by Envirocon with Nick Bugosh observing.

Dennis Braun

Analyst: Dennis Braun
Date: 11/14/89

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19103	89-19104	89-19105
SAMPLE IDENTIFICATION	140101-144	140101-131	140101-132
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1000	1025	1130
Purgeable Organics (EPA Method 601):	ug/l	ug/l	ug/l
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	4.2	<0.50
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	<0.50	<0.50	<0.50
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19106	89-19107	89-19108
SAMPLE IDENTIFICATION	140101-134	140101-135	140101-136
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1300	1405	1500
Purgeable Organics (EPA Method 601):	ug/l	ug/l	ug/l
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	2.9	39
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	5.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	2.1
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	2.6
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	8.0	21	459
trans-1,2-Dichloroethene	<1.0	<1.0	4.2
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	118	86	148
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	10	14	32
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19109	89-19110	89-19111
SAMPLE IDENTIFICATION	140101-137	140101-138	140101-139
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1500	1540	1605
Purgeable Organics (EPA Method 601):	ug/l	ug/l	ug/l
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	40	319	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	5.1	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	2.1	1.2	<1.0
1,3-Dichlorobenzene	<1.0	3.5	<1.0
1,4-Dichlorobenzene	2.8	43	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	454	84	13
trans-1,2-Dichloroethene	4.5	26	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	141	11	96
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	33	19	5.7
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	1.7	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19110 dup
SAMPLE IDENTIFICATION	140101-138
SAMPLE DATE	10/20/89
SAMPLE TIME	1540
Purgeable Organics (EPA Method 601):	ug/l
Bromodichloromethane	<1.0
Bromoform	<1.0
Bromomethane	<1.0
Carbon tetrachloride	<0.50
Chlorobenzene	333
Chloroethane	<1.0
2-Chloroethylvinyl ether	<1.0
2-Chlorotoluene	<1.0
Chloroform	<1.0
Chloromethane	<1.0
Dibromochloromethane	<1.0
1,2-Dichlorobenzene	1.0
1,3-Dichlorobenzene	3.4
1,4-Dichlorobenzene	42
1,1-Dichloroethane	<1.0
1,2-Dichloroethane	<0.50
1,1-Dichloroethene	<0.50
cis-1,2-Dichloroethene	88
trans-1,2-Dichloroethene	28
1,2-Dichloropropane	<1.0
cis-1,3-Dichloropropene	<1.0
trans-1,3-Dichloropropene	<1.0
Methylene chloride	<1.0
1,1,2,2-Tetrachloroethane	<1.0
Tetrachloroethene	14
1,1,1-Trichloroethane	<0.50
1,1,2-Trichloroethane	<1.0
Trichloroethene	18
Trichlorofluoromethane	<1.0
Vinyl chloride	1.8
Dichlorodifluoromethane	<1.0

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

LAB NO.	89-19112	89-19113	89-19114
SAMPLE IDENTIFICATION	140101-140	140101-141	140101-142
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1645	1710	1740
Purgeable Organics (EPA Method 601):	ug/l	ug/l	ug/l
Bromodichloromethane	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Bromomethane	<1.0	<1.0	<1.0
Carbon tetrachloride	<0.50	<0.50	<0.50
Chlorobenzene	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
2-Chloroethylvinyl ether	<1.0	<1.0	<1.0
2-Chlorotoluene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
1,1-Dichloroethane	<1.0	<1.0	<1.0
1,2-Dichloroethane	<0.50	<0.50	<0.50
1,1-Dichloroethene	<0.50	<0.50	<0.50
cis-1,2-Dichloroethene	13	42	6.8
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0
Methylene chloride	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	96	197	355
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Trichloroethene	5.1	15	13
Trichlorofluoromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Dichlorodifluoromethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston / BN

PAGE 1

LAB NO.	89-19115	89-19116	89-19117
SAMPLE IDENTIFICATION	140101-133	140101-145	140101-146
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1200	1145	1150
VOLATILE ORGANIC CONSTITUENT	ug/l	ug/l	ug/l
Dichlorodifluoromethane	<1.0	<1.0	<1.0
Chloromethane	<1.0	<1.0	<1.0
Vinyl chloride	<0.50	<0.50	<0.50
Bromomethane	<1.0	<1.0	<1.0
Chloroethane	<1.0	<1.0	<1.0
Trichlorofluoromethane	<1.0	<1.0	<1.0
1,1-Dichloroethene	<0.50	<0.50	<0.50
Methylene Chloride	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	<1.0	<1.0	<1.0
1,1-Dichloroethane	<1.0	<1.0	<1.0
2,2-Dichloropropane	<1.0	<1.0	<1.0
cis-1,2-Dichloroethene	<1.0	<1.0	<1.0
Chloroform	<1.0	<1.0	<1.0
Bromochloromethane	<1.0	<1.0	<1.0
1,1,1-Trichloroethane	<0.50	<0.50	<0.50
Carbon Tetrachloride	<0.50	<0.50	<0.50
1,1-Dichloropropene	<1.0	<1.0	<1.0
Benzene	0.79	<0.50	<0.50
1,2-Dichloroethane	<0.50	<0.50	<0.50
Trichloroethene	<0.50	<0.50	<0.50
1,2-Dichloropropane	<1.0	<1.0	<1.0
Bromodichloromethane	<1.0	<1.0	<1.0
Dibromomethane	<1.0	<1.0	<1.0
Toluene	<1.0	<1.0	<1.0
1,1,2-Trichloroethane	<1.0	<1.0	<1.0
Tetrachloroethene	<0.50	<0.50	<0.50
1,3-Dichloropropane	<1.0	<1.0	<1.0
Dibromochloromethane	<1.0	<1.0	<1.0
1,2-Dibromoethane	<1.0	<1.0	<1.0
Chlorobenzene	<1.0	<1.0	<1.0
1,1,1,2-Tetrachloroethane	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

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LAB NO.	89-19115	89-19116	89-19117
SAMPLE IDENTIFICATION	140101-133	140101-145	140101-146
SAMPLE DATE	10/20/89	10/20/89	10/20/89
SAMPLE TIME	1200	1145	1150
VOLATILE ORGANIC CONSTITUENT	ug/l	ug/l	ug/l
Ethylbenzene	6.0	<1.0	<1.0
p-Xylene	<1.0	<1.0	<1.0
m-Xylene	<1.0	<1.0	<1.0
o-Xylene	<1.0	<1.0	<1.0
Styrene	<1.0	<1.0	<1.0
Bromoform	<1.0	<1.0	<1.0
Isopropylbenzene	6.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane	<1.0	<1.0	<1.0
Bromobenzene	<1.0	<1.0	<1.0
1,2,3-Trichloropropane	<1.0	<1.0	<1.0
n-Propylbenzene	3.4	<1.0	<1.0
2-Chlorotoluene	1.0	<1.0	<1.0
1,3,5-Trimethylbenzene	<1.0	<1.0	<1.0
4-Chlorotoluene	<1.0	<1.0	<1.0
tert-Butylbenzene	4.6	<1.0	<1.0
1,2,4-Trimethylbenzene	<1.0	<1.0	<1.0
sec-Butylbenzene	<1.0	<1.0	<1.0
p-Isopropyltoluene	<1.0	<1.0	<1.0
1,3-Dichlorobenzene	<1.0	<1.0	<1.0
1,4-Dichlorobenzene	<0.50	<0.50	<0.50
n-Butylbenzene	4.0	<1.0	<1.0
1,2-Dichlorobenzene	<1.0	<1.0	<1.0
1,2-Dibromo-3-Chloropropane	<1.0	<1.0	<1.0
1,2,4-Trichlorobenzene	<1.0	<1.0	<1.0
Hexachlorobutadiene	<1.0	<1.0	<1.0
Naphthalene	21	<1.0	<1.0
1,2,3-Trichlorobenzene	<1.0	<1.0	<1.0
cis-1,3-Dichloropropene	<1.0	<1.0	<1.0
trans-1,3-Dichloropropene	<1.0	<1.0	<1.0

cc: Envirocon, Livingston

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: EPA WATER SUPPLY QUALITY
CONTROL SAMPLE

Volatile Organic Contaminants

CONSTITUENT	True Value ug/l	P (%)	Range for P (%)
Bromochloromethane	5.0	111	60-140
Chloroform	5.0	112	60-140
Carbon Tetrachloride	5.1	100	60-140
Trichloroethene	5.0	103	60-140
1,2-Dibromoethane	5.0	126	60-140
1,1,1,2-Tetrachloroethane	4.9	108	60-140
Tetrachloroethene	5.0	82	60-140
1,2-Dibromo-3-Chloropropane	5.0	109	60-140
1,3-Dichlorobenzene	5.0	107	60-140

P = percent recovery measured.

NOTE: This EPA Quality Control sample was analyzed with your lab no.s 89-19103 thru 89-19114 with the above results

cc: Envirocon, Livingston.

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ENVIROCON
PO BOX 8243
MISSOULA MT 59807

PROJECT: Livingston/BN

Quality Assurance Spiked Analysis

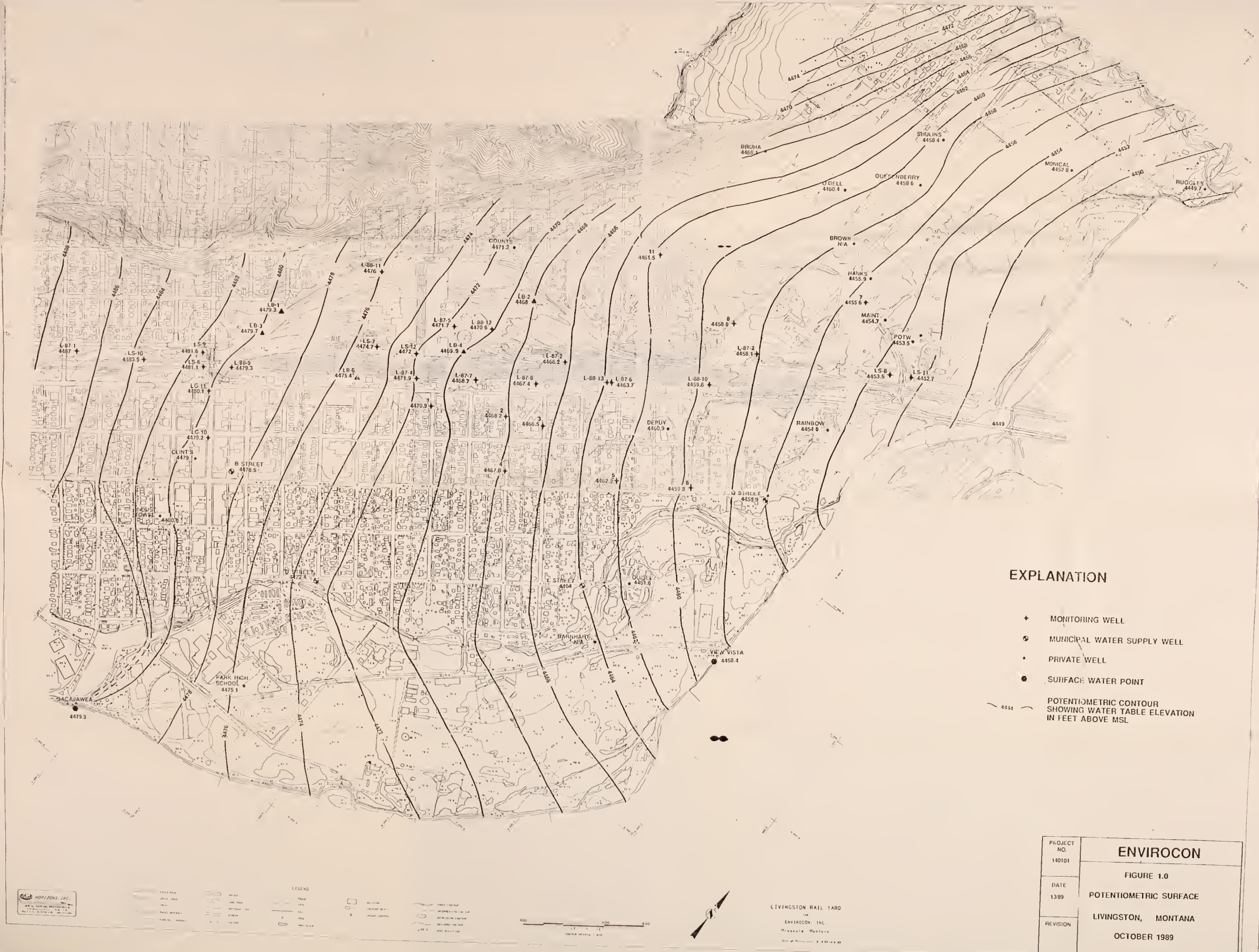
CONSTITUENT	SPIKE AMOUNT ug/l	P (%)	RANGE FOR P (%)
Bromochloromethane	5.0	106	60-140
Chloroform	5.0	112	60-140
Carbon Tetrachloride	5.1	104	60-140
Trichloroethene	5.0	111	60-140
1,2-Dibromoethane	5.0	102	60-140
1,1,1,2-Tetrachloroethane	4.9	92	60-140
Tetrachloroethene	5.0	95	60-140
1,2-Dibromo-3-Chloropropane	5.0	118	60-140
1,3-Dichlorobenzene	5.0	108	60-140

P = percent recovery measured.

NOTE: Lab no. 89-19111 was spiked
with the above constituents
with these results.

cc: Envirocon, Livingston.

DEPARTMENT OF HEALTH AND
ENVIRONMENTAL SCIENCES
STATE OF MONTANA
COGSWELL BUILDING
HELENA, MONTANA 59620



EXPLANATION

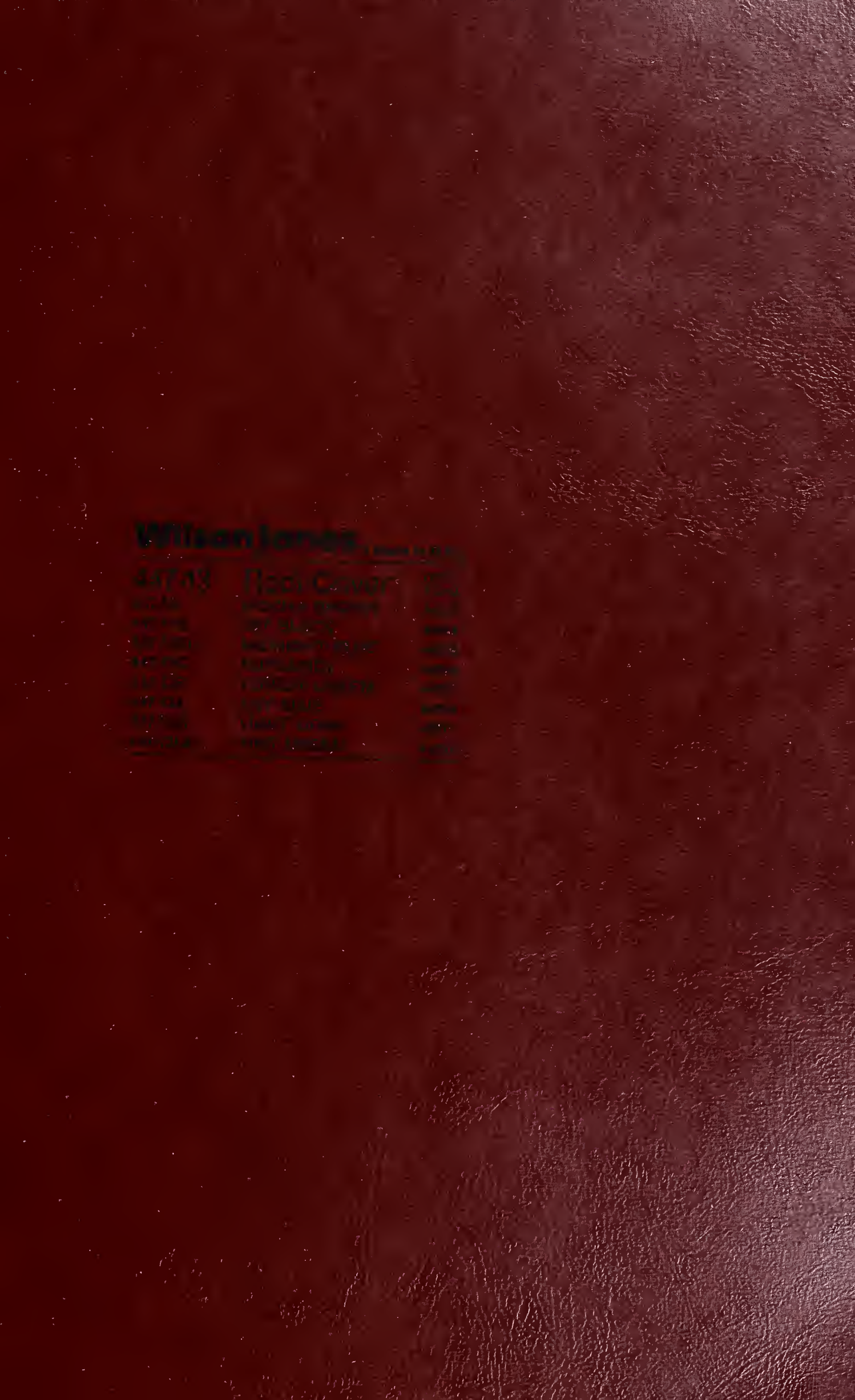
- ✦ MONITORING WELL
- ◉ MUNICIPAL WATER SUPPLY WELL
- • PRIVATE WELL
- ● SURFACE WATER POINT
- 4444 POTENTIOMETRIC CONTOUR SHOWING WATER TABLE ELEVATION IN FEET ABOVE MSL

PROJECT NO. 140101	ENVIROCON
DATE 12/89	FIGURE 1.0
REVISION	POTENTIOMETRIC SURFACE
	LIVINGSTON, MONTANA
	OCTOBER 1989

HORIZONS, INC.

LEGEND

LIVINGSTON RAIL YARD
for
ENVIROCON, INC.
Missoula, Montana


Wilson Jones
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